CENTER FOR FOOD SAFETY

September 16, 2015

RE: Comment on draft paper on Climate Smart Agriculture in Feed the Future

Dear Rob Bertram:

Center For Food Safety (CFS) welcomes the opportunity to offer the following comments on the United States Agency for International Development's (USAID) Bureau For Food Security (BFS) draft paper on Climate Smart Agriculture (CSA) in Feed the Future.

CFS is a nonprofit, public interest advocacy organization dedicated to protecting human health and the environment by curbing the proliferation of harmful food production technologies and promoting sustainable agriculture. As a membership organization, CFS represents more than 700,000 farmer and consumer members who reside in every state across the country, and who support safe, sustainable food systems.

Changes Needed in the Draft Paper

The primary expressed purpose of the CSA initiative (hereafter "draft paper") is to adapt to and mitigate the impacts of climate change on agriculture. However, there are other critically important parameters that should also be addressed by this initiative. We outline the most important parameters that should be, but are not, adequately addressed in the draft letter. We also make recommendations for changing the draft both to improve its primary purpose and to address the other important, related issues.

Smallholder Farmers Must be Leaders of the Planning Process

To its credit, the draft paper gives prominence to smallholder farmers, and asserts that their wellbeing is paramount. For example, it notes that in some regions, such as sub-Saharan Africa, climate emissions may justifiably increase because of the need for increased productivity, but would still conform to the standards of the CSA initiative.

It is important to note that smallholder farmers produce about 70 percent of the food

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consumed in developing countries.[1] It has also been shown that small farms, when resources are available, are more productive per unit of land than large farms.[2,3] Smallholder farmers are also the stewards of much of the genetic diversity of crops, in the form of landraces, which are critically important for response to climate change and other challenges to agriculture. One such other challenge is new emerging pests.

In addition, these farmers and their communities are often under the greatest threat from climate change because increasing climate extremes are projected to disproportionately affect many parts of the global south.

For these and many other reasons, smallholder farmers should be at the center of support for any agriculture initiative, including CSA.

As one of the primary stakeholder groups, and following basic democratic principles, these farmers and their representative organizations should be leaders in the decision making process for CSA. Therefore, food sovereignty and food justice must also be at the center of the CSA initiative.[4]

To the contrary, there is no evidence that smallholder farmers would play such a central role, and in fact, there is no evidence that they would play even a substantive role. In several places the draft paper mentions civil society participation, but does not say whether these civil society organizations must include smallholder farmers and their representatives, let alone that these should take a leading role. It also does not define the relative roles of civil society organizations compared to other stakeholders.

As the draft paper stands, and some of its text seems to suggest, civil society may be recipients of proposals developed by other stakeholders, such as the private sector and technologists, rather than principle decision makers on farming methods or technologies from the beginning, in a truly participatory manner.

The CSA Concept is Too Narrow, and Must Include Other Ecosystem Values and Services as Targets for Mitigation

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[1] Food and Agriculture Organization of the United Nations (2014) "The State of Food and Agriculture: Innovation in Family Farming." Rome, 2014.
[2] Ibid.
[3] Carletto et al. (2013) "Fact or artifact: The impact of measurement errors on the farm size–productivity relationship." *Journal of Development Economics* Volume 103, July 2013, Pages 254–261.
[4] Food Sovereignty, as defined by La Via Campesina, is "A critical part of agroecology defined as the right of each nation and its peoples to maintain and develop capacity to produce basic food while respecting productive and cultural diversity."
Claeys, Priscilla (2013) "From Food Sovereignty to Peasants' Rights: an Overview of Via Campesina's Struggle for New Human Rights." http://viacampesina.org/downloads/pdf/openbooks/EN-02.pdf. Accessed July 29, 2015.

The draft paper focuses on climate mitigation or adaptation, and scarcely mentions the importance of other ecosystem values and services. For example, on page 11, the draft paper notes: "**Scaling agricultural technologies:** A number of technologies developed as a result of Feed the Future research investments offer substantial opportunities for generating a double-win around productivity and adaptation." Elsewhere, the draft letter mentions the possibility of considering other unnamed environmental benefits, but does not specify what they might be, or include them as important metrics.

This remains too narrow a focus and will likely lead to recommending farming methods and technologies that do not address other critically important aspects of agriculture's relationship with the environment.

The overriding reason that agriculture is contributing so greatly to climate change emissions, as well as other environmental and social problems, is the historical and overwhelming focus on food productivity alone. The CSA initiative is in danger of replaying that history by merely adding the single, although extremely important, criteria of climate change to this focus, while neglecting other important environmental and social values.

For example, the focus on CSA neglects the huge global impacts that industrial agriculture has on biodiversity through habitat destruction and synthetic chemical use, on water pollution, such as hypoxic zones from nitrogen and phosphorus fertilizers, on that overuse of fresh water, and on loss of soil and soil fertility.

Although imperfect, we recommend that the draft initiative gives highest priority to agriculture methods and systems that address identified global environmental boundaries[5] that are under greatest threat including loss of biodiversity (crop and natural flora and fauna), nitrogen and phosphorus pollution, overuse of fresh water, as well as climate change. Regenerative soil practices are also critical for the multiple roles soil plays in facilitating ecosystem values and productivity, including carbon sequestration.

Although more challenging than addressing climate alone, such an approach is necessary given the magnitude of other impacts on the environment and societies.

The good news is that we can attain not only the "double-win" that the draft letter notes, but by employing agroecological farming systems, all of the environmental harms that need to be reversed can usually be addressed. Research supports the greater efficacy of ecologically-based practices in improving environmental measures from nitrogen and other water pollution[6], to

[5] Stockholm Resilience Centre. "The 9 Planetary Boundaries." http://www.stockholmresilience.org/21/research/research-programmes/planetary-boundaries/planetary-boundaries/about-the-research/the-nine-planetary-boundaries.html

[6] Blesh, J., and L.E. Drinkwater (2013) "The impact of nitrogen source and crop rotation on nitrogen mass balances in the Mississippi River Basin." Ecological Applications. In press. Online at http://dx.doi.org/10.1890/12-0132.1.

biodiversity, to climate impact, and to increased productivity (see studies below).

These methods also require fewer purchased inputs, and are therefore less costly. This can be of great benefit to poor smallholder farmers.

Metrics for measuring success must not disadvantage smallholder farmers through complexity of expense

One inappropriate aspect of some previous proposals for climate mitigation, for example soil carbon sequestration, included measurement methodologies that could not be adapted by most smallholder farmers.

The CSA initiative should rely on approved and accessible methods rather than require expensive or technically complex measurements of success so as not to disadvantage smallholder farmers.

Productivity, Land Use, and Biodiversity

Although climate is the focus of the draft paper, the importance of adequate productivity is acknowledged, but perhaps overemphasized. Productivity should not be the focus at the expense of other environmental considerations as it is not usually the dispositive factor in determining adequate nutrition. In addition, the draft letter remarks that increasing productivity leads to increased biodiversity by sparing wild areas. On page 2, the draft letter includes the following: "Indirectly, ***sustainable intensification of prime agricultural land helps relieve pressures*** on more marginal or fragile lands, or on biodiversity-rich natural areas." [emphasis added]

This idea of "land sparing" is not generally supported by research.[7,8] Unless strong national policies are in place to prevent conversion of natural areas to farmland, increased productivity may actually lead to increased conversion. In many cases, agroecological farming systems that provide diverse habitat often also increase overall regional biodiversity compared to highly productive industrial agriculture that favors mono-cropping.

The assumption that intensive industrial agriculture is more productive than agroecologically-based systems is also contradicted by numerous research projects. Therefore, the supposed advantage of high-purchased-input farming systems, such as industrial sustainable intensification, over agroecology for land sparing, is not generally supportable.

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[7] Perfecto, Ivette and Vandermeer, John (2010) "The agroecological matrix as alternative to the land-sparing/agriculture intensification model," *Proceedings of the National Academy of Sciences* vol. 107 no. 13.

[8] Kremen, Claire (2015) "Reframing the land-sparing/land-sharing debate for biodiversity conservation," *Annals of the New York Academy of* Sciences Issue: The Year in Ecology and Conservation Biology. Ann. N.Y. Acad. Sci. ISSN 0077-8923.

Examples of research supporting increased or high productivity for organic and agroecology systems include:

- In 286 projects across 57 developing countries and 37 million hectares, average crop yields increased by 79 percent using ecological, resource-conserving methods.[9]

- A long-term Farming Systems Trial at the Rodale Institute shows that corn and soybean yields from organic systems match the yields from conventional systems except during drought, when the organic systems yielded 30 percent more corn than conventional.[10]

- On-going field research in Ethiopia concludes that organic compost fertilizer results in higher crop yields (3 to 5 times) compared to yields from plots treated with synthetic fertilizer.[11]

- Based on assessments of 208 ecological agriculture projects, approximately half of those projects resulted in significant yield increases—50 to 100 percent for rain-fed crops and 5 to 10 percent for irrigated crops. Data also revealed an increase in average food production per household by 73 percent (in one year) for 4.42 million small farmers growing cereals and roots on 3.6 million hectares.[12]

- University of California, Berkeley researchers reviewed 115 studies containing more than 1000 observations makes a strong case that organic farming can play an important, and growing, role in "feeding the world." They demonstrate that the organic to conventional yield gap is often exaggerated, and further found that agroecological methods such as long crop rotations (alternating crops year-to-year) and polyculture (growing several crop species together in one field) yielded much better results than their bare-bones organic counterparts.[13]

- The Sustainable Agriculture Farming Systems project at UC-Davis shows organic and low-input systems have yields comparable to conventional systems in all crops tested and in some instances, resulted in higher yields.[14]

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[9] J.N. Pretty et al., (2006) "Resource-Conserving Agriculture Increases Yields in Developing Countries," Environmental Science & Technology 40 (4), 2006, http://www.icarrd.org/en/ref_doc_down/ sust_pretty_final.pdf.
[10] Christos Vasilikiotis (2000) "Organic Farming Can Feed The World?" College of Natural Resources - UC Berkeley, November 2000, http://www.cnr.berkeley.edu/~christos/articles/cv_organic_farming.html.
[11] Jakob Lundberg and Fredrik Moberg (2008) "Ecological in Ethiopia" report, Stockholm: Swedish Society for Nature Conservation, 2008.
[12] Jules Pretty and Rachel Hine (2001) "Reducing Food Poverty with Sustainable Agriculture: A Summary of New Evidence." Colchester, UK: University of Essex, 2001.
[13] Ponisio et al. (2014) "Diversification practices reduce organic to conventional yield gap." Proc. R. Soc. B 282: 20141396. http://dx.doi.org/10.1098/rspb.2014.1396
[14] Christos Vasilikiotis (2000) "Can Organic Farming Can Feed The World?" College of Natural Resources

- A 2008 joint UNEP-UNCTAD report, Organic Agriculture and Food Security in Africa, analyzed multiple studies to conclude that organic systems increase yields and provide benefits for food availability and natural resources. Food production demonstrated yield increases based on per hectare productivity.[15]

- In a region of Burkina Faso, sorghum yields increased by 400 percent through compost/manure management during the dry season which resulted in higher soil fertility and restoration of degraded land.[16]

- An 8-year field study at Iowa State University found that grain yields, mass of harvested products, and profit in more diverse systems were similar to, or greater than, those in the conventional system, despite reductions of agrichemical inputs.[17]

- In addition to the above studies, the FAO report Organic Agriculture, Environment, and Food Security contains numerous comprehensive studies from countries demonstrating successes in converting to regenerative, organic agricultural systems.[18]

Traditional agriculture practices, where they have not been lost, represent a repository of knowledge and technologies that have been built up over many generations. While it may be appropriate to supplement or improve those practices in some ways, it does not generally need to be replaced. For example, farmers in regions already experiencing climate-related shifts in weather patterns are finding that indigenous seeds and traditional farming methods are keys to adaptation and survival. These seeds often adapt much better to drought, heat, salinization, and require less water than many commercial, industrial seeds used in "modern" agriculture.

The resilience and robustness of ecological farming is needed in times of climate change, especially during extreme climate events. For example: A study of 80 communities of smallholder farmers in Nicaragua following Hurricane Mitch in 1998 found that plots using

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- UC Berkeley, November 2000, http://www.cnr.berkeley.edu/~christos/articles/cv_organic_ farming.html.

[15] Rachel Hine, Jules Pretty, and Sophia Twarog (2008) "Organic Agriculture and Food Security in Africa" Geneva, Switzerland: UNEP-UNCTAD Capacity-building Task Force on Trade, Environment and Development, 2008.

[16] Jeanne Roy, (2008) "Ten Stresses on the Planet: Loss of Topsoil" issue brief, Portland, OR: Center for Earth Leadership, 2008. See also: Rachel Hine, Jules Pretty, and Sophia Twarog (2008) "Organic Agriculture and Food Security in Africa," report, Geneva, Switzerland: UNEP-UNCTAD Capacity-building Task Force on Trade, Environment and Development, 2008.

[17] Davis, A.S., J.D. Hill, C.A. Chase, A.M. Johanns, and M. Liebman (2012) "Increasing cropping system diversity balances productivity, profitability and environmental health." PLOS ONE 7(10):e47149. doi:10.1371/journal.pone.0047149.

[18] Nadia El-Hage Scialabba and Caroline Hattam (2002) "Organic Agriculture, Environment, and Food Security, Environment and Natural Resources Service Sustainable Development Department" FAO, Rome, 2002.

ecological methods had on average retained 40 percent more topsoil, higher field moisture, less erosion, and lower economic losses than plots on industrial farms.[19]

To reiterate, while science may enhance or complement local agroecological farming practices, those methods have generally been shown to be sustainable, resilient, and productive. Furthermore, input and technology intensive methods are often not appropriate for countries that are capital-poor and knowledge-rich.

The need for more transparency, and ensuring that powerful stakeholders who benefit from industrial agriculture do not dominate the process

More transparency and a resolution of certain conflicts of interest would make this paper more useful.

Companies that have a powerful economic interest in maintaining harmful industrial agriculture practices have leading roles in Climate Smart Agriculture programs.

Of particular concern is the Global Alliance for Climate Smart Agriculture's (GACSA) participation in setting the rubric by which these programs are judged. Specifically, within GACSA is a large contingent of fertilizer companies. The overuse of synthetic fertilizer in industrial farming operations causes some of the biggest environmental problems associated with agriculture:

- The 2007 IPCC report shows that of the 60 percent of total global nitrous oxide (a GHG 296 times more potent than CO2), most emissions are attributable to synthetic nitrogen fertilizer.

- Synthetic nitrogen fertilizer production emits around 41 million metric tons of CO2 per year.[20]

- From 1968 to 2008, worldwide fertilizer consumption increased more than 400 percent, rising from 31.6 to 156 million tons.[21]

- Fertilizer runoff is a driving factor in the rise of dead zones in the ocean. Identified dead

[19] Eric Holt-Gimenez (2002) "Measuring Farmers' Agroecological Resistance After Hurricane Mitch in Nicaragua: A Case Study in Participatory, Sustainable Land Management Impact Monitoring," Agriculture, Ecosystems and the Environment, 93 (1-2), 20002, p. 87-105.
[20] Gar Smith (2010) "A Harvest of Heat: Agribusiness and Climate Change," report, Berkeley: Agribusiness Action Initiatives - North America, 2010.
[21] IFA, International Fertilizer Industry Association - IFADATA, International Fertilizer Industry Association, http://www.fertilizer.org/ifa/ifadata/search (accessed 21 January 2011).

zones have sky-rocketed from 49 in the 1960s to 405 in 2008.[22]

While CFS does not oppose all uses of synthetic fertilizer in agricultural production, it believes that organic sources such as legumes and manure should be highly prioritized. We question whether agroecological alternatives will be fully advocated for in the presence of such vested interest as is present in GACSA.

Conclusions and Recommendations

While the draft letter emphasizes the importance of smallholder farmers, it does not ensure that they take a role in the CSA initiative commensurate with their centrality to the issue.

The draft letter also does not address the other environmental externalities caused mainly by industrial agriculture, and thereby misses an important opportunity to reverse these problems. Agroecological methods and farming systems typically result in the improvement of multiple ecosystem values and services, yet they are not included.

- We strongly recommend that the text be edited to explicitly include smallholder farmers as leaders and decision makers in the CSA process.

- The draft letter should be amended to include strong preference for agroecological systems that provide multiple ecosystem services and values in addition to climate adaptation and mitigation. Expensive technological approaches are typically not as effective for achieving climate goals or for improving other environmental parameters and should not be emphasized.

- CSA methods should not require expensive or complex measurement of success or progress by farmers.

- And finally, true engagement is difficult when there are questions of a conflict of interest or transparency, both of which are inherent in the current responsibilities of GACSA.

Thank you for the opportunity to provide comments on this important issue.

Respectfully submitted,

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[22] David Biello, Oceanic Dead Zones Continue to Spread: Scientific American, in: Scientific American, 15 August 2008, http://www.scientificamerican.com/article.cfm?id=oceanic-deadzones-spread.

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